Comparison between halo CME expansion speeds observed on the sun, their average propagation speeds to earth and their corresponding counterparts near earth

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We have compared characteristics of 85 halo CMEs observed on the sun by the Large Angle and Spectroscopic Coronagraph on SOHO with their corresponding counterparts observed near earth by the magnetic field and plasma instruments on board of ACE, WIND and SOHO satellites, in the period from January 1997 to April 2001. First, we focussed on the comparison between the lateral expansion speeds of these halos and the corresponding ejecta speeds near earth. It is found that there is a relation between these two speeds, but the scatter is high. If one takes a subset from these data which includes only those CMEs that showed magnetic cloud structures near earth (21 cases), the correlation mentioned above increases. The results are very similar to the study done by Lindsay et al (1999) using observations made from Solwind and SMM coronagraphs, and Helios-1 and PVO plasma and interplanetary field data from the period of 1979 to 1988. Also, we reviewed the relations between the average CME propagation speed to earth and the ejecta speeds near earth. We found a relation for this set of data which differs from the relation derived by Cliver et al. (1990). This kind of relation is very important to estimate ejecta speeds of events for which no interplanetary observations are available.

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